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What is claimed is:

1. A projection tube comprising a panel which forms a phosphor screen on an inner surface thereof, a funnel, a neck portion and a stem portion which seals the neck portion, wherein

5 the neck portion includes a first neck portion which constitutes a portion connected to the funnel portion and has a first neck outer diameter, and a second neck portion which constitutes a portion which accommodates an electron gun and has a second neck outer diameter,

10 the first neck outer diameter is set smaller than the second neck outer diameter,

the electron gun emits a single electron beam to the phosphor screen, and

15 a maximum operating voltage of the electron gun is set to equal to or more than 25 kV.

2. A projection tube according to claim 1, wherein the maximum operating voltage is set to equal to or more than 30 kV.

3. A projection tube according to claim 1, wherein a maximum cathode current is set to equal to or more than 4 mA.

4. A projection tube according to claim 1, wherein the first neck outer diameter is set to equal to or less than 29.1 mm.

20 5. A projection tube according to any one of preceding claims 1 and 4, wherein the second neck outer diameter is set to equal to or more than 36.5 mm.

6. A projection tube according to claim 1, wherein the first neck outer diameter is set to 29.1 mm and the second neck outer diameter is set to 36.5
25 mm.

7. A projection tube according to claim 5, wherein the stem portion includes a plurality of pins for supplying voltages to electrodes of the electron gun and the plurality of pins are arranged in a circle having the diameter of 15.12 mm.

5 8. A projection tube comprising a panel which forms a phosphor screen on an inner surface thereof, a funnel, a neck portion and a stem portion which seals the neck portion, wherein

the neck portion includes a first neck portion which constitutes a portion connected to the funnel portion and has a first neck outer diameter, and a second neck portion which constitutes a portion which accommodates an electron gun and has a second neck outer diameter,

the first neck outer diameter is set smaller than the second neck outer diameter,

the electron gun emits a single electron beam to the phosphor screen,

15 a maximum operating voltage of the electron gun is set to equal to or more than 25 kV, and

a deflection yoke which deflects the electron beam is mounted on the first neck portion having the first neck outer diameter.

9. A projection tube according to claim 8, wherein the projection tube 20 includes a convergence yoke which adjusts the convergence when the projection tube is incorporated into a projector, and

the convergence yoke is mounted on the second neck portion having the second neck outer diameter.

10. A projection tube according to claim 8, wherein the first neck outer 25 diameter is set to equal to or less than 29.1 mm.

11. A projection tube according to any one of claim 8 and claim 10, wherein the second neck outer diameter is set to equal to or more than 36.5 mm.

12. A projection tube according to claim 8, wherein the first neck outer diameter is set to 29.1 mm and the second neck outer diameter is set to 36.5 mm.

13. A projection tube according to claim 11, wherein the stem portion includes a plurality of pins for supplying voltages to electrodes of the electron gun and a plurality of said pins are arranged in a circle having the diameter of 15.12 mm.